

New additions to Turkish macrofungi from Tokat and Yozgat Provinces

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ABSTRACT—Macrofungal samples collected from Tokat and Yozgat provinces during 2014–2017 were identified as new records for the Turkish mycota: *Ciboria viridifusca*, *Clitocybe amarescens*, *Mycena polyadelpha*, *Rutstroemia conformata*, and *Symphyosirinia galii*. Short descriptions, illustrations, and discussions are provided.

KEY WORDS—Agaricales, biodiversity, Funga, *Helotiales*, taxonomy

Introduction

Checklists on Turkish larger fungi have been prepared by Sesli & Denchev (2014) and Solak & al. (2015). However, some new records have been added to the Turkish mycota by various studies (Akata & Doğan 2015, Doğan & Öztürk 2015, Kaya & Uzun 2015, Kaya 2015, Sesli & al. 2015, 2016; Sesli & Moreau 2015, Taşkın & al. 2016, Allı & al. 2017, Akata & Sesli 2017, Sesli & Vizzini 2017, Türkekul 2017, Işık & Türkekul 2017, 2018; Uzun & al. 2017, Uzun & Demirel 2017, Demirel & al. 2017, Akata & Gürkanlı 2018, Sesli 2018, Uzun & Kaya 2018, Kaya & al. 2018).

Tokat is situated in the inland part of the Middle Black Sea Region (Turkey); Tokat province lies about 650–1500 m asl and has a semi-arid climate. Field studies were carried out in areas which are generally surrounded by evergreen and deciduous forests. Akbelen highland (~30 km from Tokat city center at an average 1400 m elevation) is a rugged area surrounded by mixed

forests dominated by *Alnus glutinosa*, *Carpinus orientalis*, *Fagus orientalis*, *Quercus pubescens*, *Q. robur*, *Pinus nigra*, and *Populus alba*. Çamaltı village (~15 km from Tokat city center at an average 900 m elevation) is covered with similar vegetation but has a drier climate. The dominant plant in the region is *Quercus pubescens*.

In Yozgat province, Akdağmadeni district (at 1352 m asl with an average annual 480–500 mm precipitation and 8–12°C temperature) has a transition climate between Black Sea and continental climates. The eastern and southern parts of the province are covered with pine forests, predominantly *Pinus sylvestris*, in association with *P. nigra*, *Populus alba*, and species of *Juniperus*, *Salix*, *Crataegus*, *Pyrus*, *Quercus*, *Rosa*, and *Corylus* [<https://www.akdagmadeni.bel.tr/akdagmadeni-ormanlari-s61.html> (accessed 10 April 2018)].

The aim of the current study is to contribute to Turkish mycobiota.

Materials & methods

The fungal specimens were collected during field trips within Tokat province and Akdağmadeni (Yozgat) district during 2014–2017. The specimens were photographed in their natural habitats, their ecological features and macroscopic features noted, assigned collection numbers, transported to the laboratory in aluminium foil and boxes, and dried for later identification. Microscopic observations were made from dried herbarium specimens mounted in distilled water, Melzer's reagent, Congo red, or KOH using a light microscope. The specimens were identified based on macroscopic and microscopic characters after consulting Maas Geesteranus (1954), Dennis (1978), Ellis (1956, 1980), Moser (1983), Bon (1987), Breitenbach & Kränzlin (1984, 1991), Verkley (1993), Baral (1994), Palmer & Tortic (1994), Bas & al. (1995), Garcia & Moreau (2002), Gerault (2005), Hairaud & Capoen (2012), Alcántara & Mora (2013). The systematics of the newly recorded taxa are in accordance with Index Fungorum (<http://www.indexfungorum.org>; accessed 10 April 2018). The identified specimens were deposited in the Fungarium of Biology Department, Gaziosmanpaşa University, Tokat, Turkey (FGOU).

Taxonomy

Sclerotiniaceae

Ciboria viridifusca (Fuckel) Höhn.,

Mitt. Bot. Inst. T.H. Wien 3(3): 101 (1926)

FIG. 1

APOTHECIA 1–4 mm, light brown and brown; cup-shaped to flat or convex atop a 1–2 mm long stalk; several fruiting bodies usually on one cone. Outer and inner surface of hymenium and stalk nearly concolorous, finely farinose. Ectal excipulum textura globulosa, medullary excipulum textura intricata.

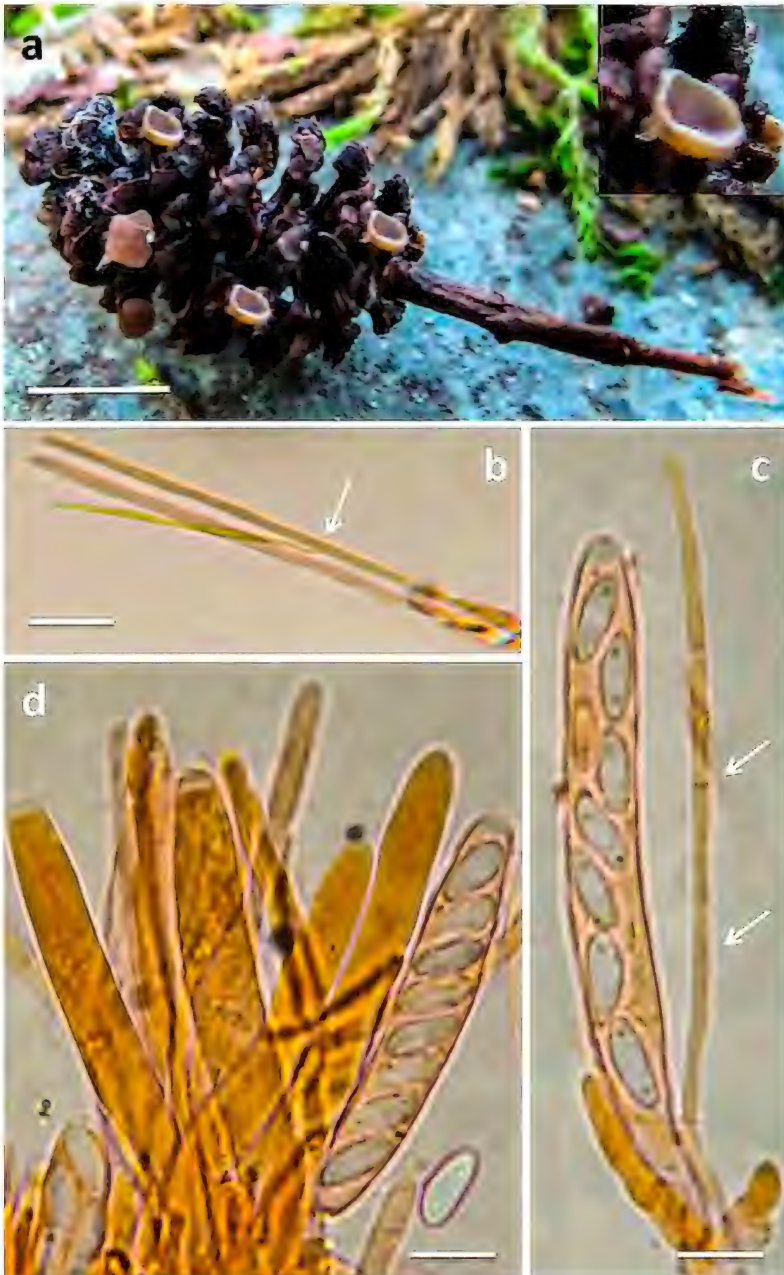


FIG. 1. *Ciboria viridifusca* (FGOU 5416): A. apothecia; B. forked paraphyses; C. amyloid apex of asci and ascospores; D. asci with ascospores and paraphyses. Scale bars: A = 3 mm; B–D = 10 μ m.

ASCOSPORES narrowly elliptical, hyaloid, smooth, without drops or with small drops at each pole, $(7-7.5-9.5(-11.3) \times (3.2-)3.5-4.5(-5) \mu\text{m}$. ASCI $(59.5-)60-80.2(-85.3) \times (4.2-)5-9(-9.5) \mu\text{m}$, cylindrical, 8-spored, inoperculate, spores monoseriate or irregularly biseriate. PARAPHYSES $60-80 \times (2-)2.5-3(-4.1) \mu\text{m}$, filiform, branched, non-septate or septate, sometimes with slight clavate swellings towards the tips.

SPECIMEN EXAMINED: TURKEY, TOKAT, Akbelen village, $40^{\circ}27'56''\text{N } 36^{\circ}38'33''\text{E}$, 1077 m, on damp female cones of *Alnus glutinosa* (L.) Gaertn. (*Betulaceae*) 19 November 2017, leg. Türkekul & Işık (FGOU 5416).

COMMENTS—Some ascospores of our Turkish specimen were bigger than those of relevant literature descriptions (Breitenbach & Kränzlin 1984: $6-7 \times 2-2.5 \mu\text{m}$; Dennis 1978: $6-9 \times 3-4 \mu\text{m}$; Alcántara & Mora 2013: $(5.8-)6.8-8.0 (-9.6) \times (2.9-)3.3-3.8(-4.2) \mu\text{m}$).

Several other *Ciboria* species also grow on fallen *Alnus* male catkins or female cones. *Ciboria amentacea* (Balb.) Fuckel resembles *C. viridifusca* but differs by growing on damp male *Alnus* catkins in spring. Another similar species is *Mollisia amenticola* (Sacc.) Rehm, which is distinguished by sessile, whitish, grayish, or light cream apothecia, and smaller spores ($5-5.5 \times 2-2.5 \mu\text{m}$; Breitenbach & Kränzlin 1984, Alcántara & Mora 2013).

Tricholomataceae

Clitocybe amarescens Harmaja, Karstenia 10: 98 (1969)

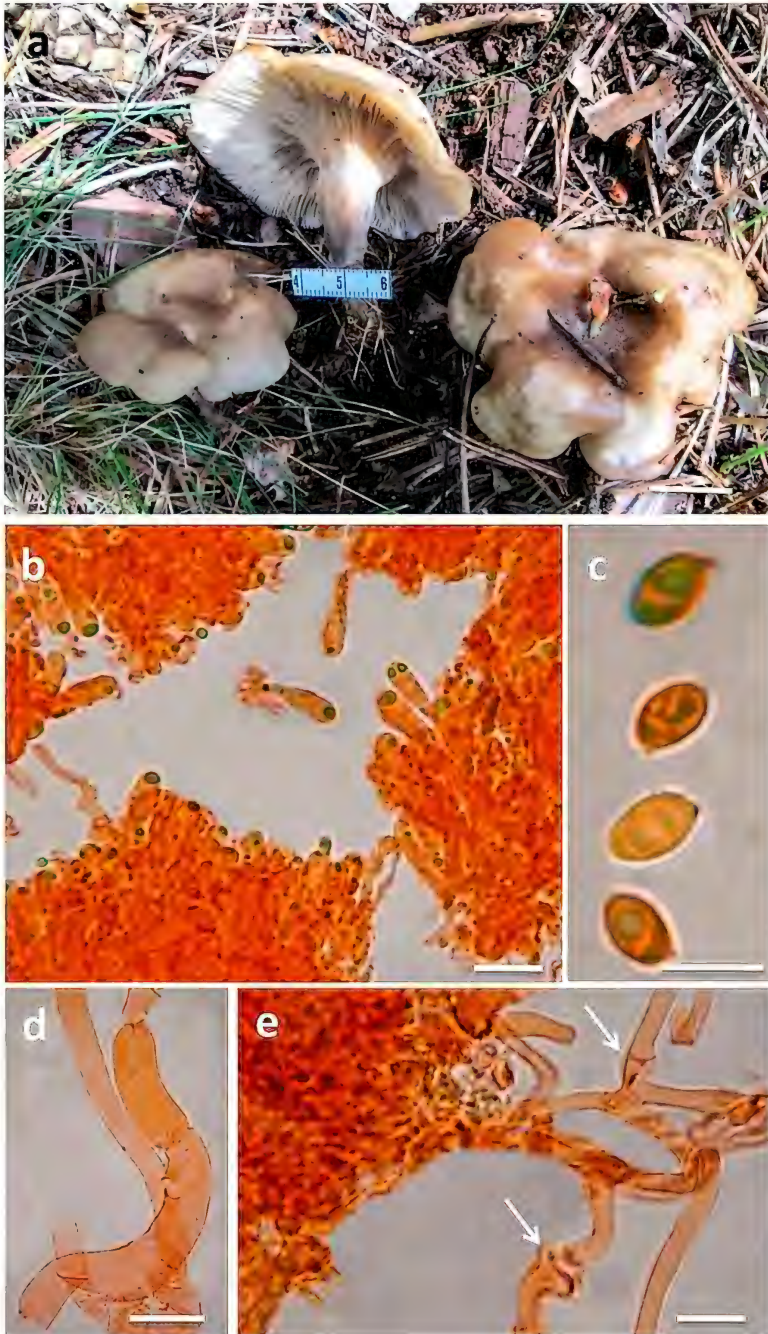
FIG. 2

PILEUS 3–6 cm, convex-depressed, grey or ochraceous brown, margin usually slightly striate, but sometimes smooth and often lobed, hygrophanous. LAMELLAE decurrent, close, cream-coloured or pale brown, slightly sloping. STIPE (20–)40 $\times$ 3–4(–6) mm, central, cylindrical to tapering downwards, concolorous with pileus with a darker base. SPORE PRINT pale cream.

BASIDIOSPORES $(4.7-)5.0-9.0(-9.8) \times (3.0-)3.5-5.0(-6.3) \mu\text{m}$, elliptical, smooth. BASIDIA clavate, $(19.3-)23-28(-28.9) \times (4.6-)5-8(-8.6) \mu\text{m}$, 4-spored. CHEILOCYSTIDIA absent. CLAMP CONNECTIONS present.

SPECIMEN EXAMINED: TURKEY, YOZGAT–Akdağmadeni, Davulbazvillage, $39^{\circ}36'07''\text{N } 35^{\circ}52'45''\text{E}$, 1629 m, among needle and cone litters *Pinus sylvestris* L. (*Pinaceae*) forest, 17 November 2014, leg. Türkekul & Işık (FGOU 4406).

FIG. 2. *Clitocybe amarescens* (FGOU 4406): A. Basidiomata in situ; B. basidia; C. basidiospores; D. elements of pileipellis; E. Clamps on basidial bases. Scale bars: A = 2 cm; B, D = 20 μm ; C, E = 10 μm .



COMMENTS—Our Turkish specimen was morphologically and ecologically very similar to published descriptions of *Clitocybe amarescens* (Bon 1987, Moser 1993, Bas & al. 1995).

Clitocybe amarescens is close to *C. metachroa* (Fr.) P. Kumm. and *C. stercoraria* H.E. Bigelow. *Clitocybe metachroa* is distinguished by its multicolored, more striate, less obviously infundibuliform pileus and longer stipe ($32\text{--}85 \times 3\text{--}6$ mm). *Clitocybe stercoraria* is separated by its greenish grey basidioma (Bas & al. 1995).

Mycenaceae

Mycena polyadelpha (Lasch) Kühner, Encyclop. Mycol. 10: 262 (1938) FIG. 3

PILEUS 0.25–3(–3.4) mm diam., convex to campanulate, surface with fine radial furrows, pubescent, white, slightly transparent, margin somewhat undulating. STIPE (3.5–)4–35(–45) $\times$ 0.1–0.2 mm, cylindrical, filiform, hollow, often bent especially when mature, slightly transparent, pruinose to smooth. Flesh very thin, transparent. LAMELLAE 8(–12), white, distant, deeply adnate and some free.

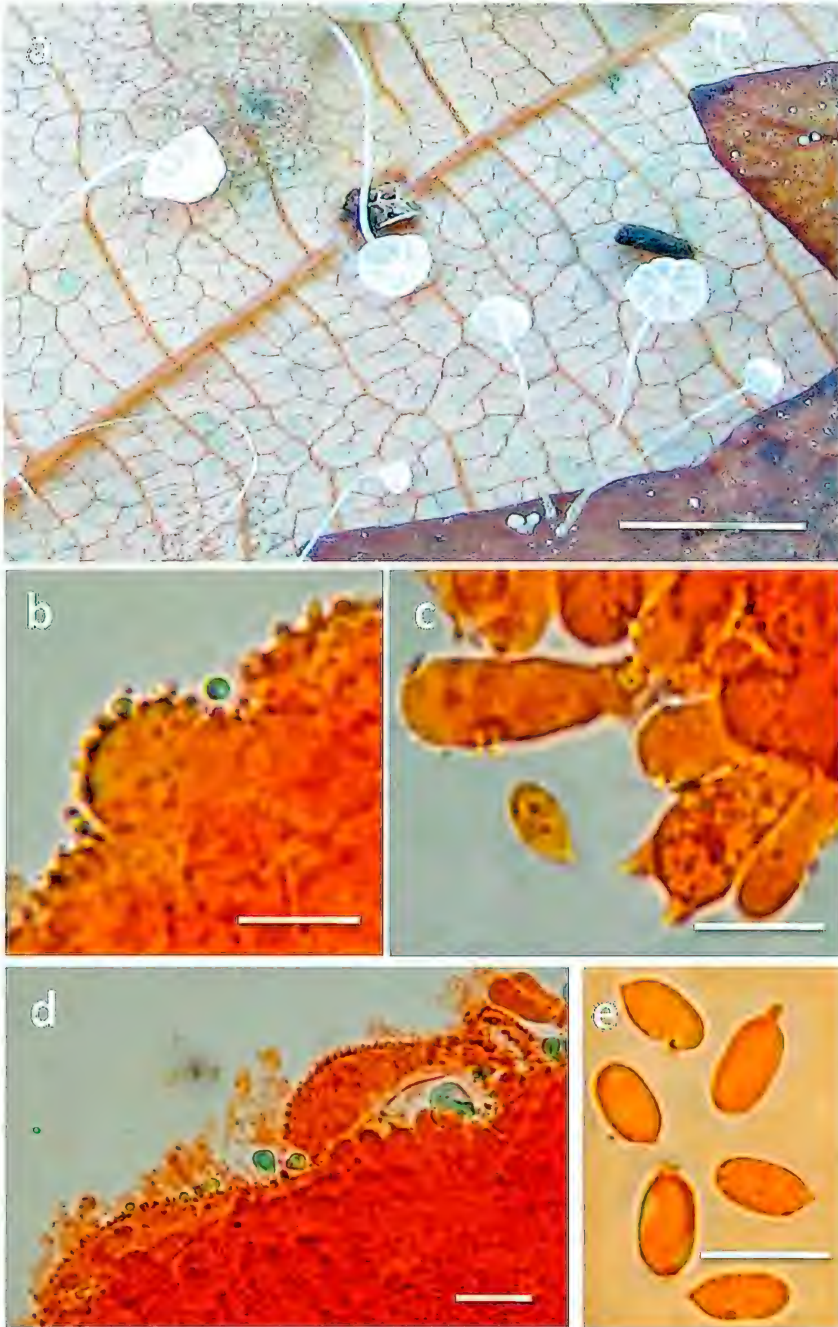
BASIDIOSPORES elliptic to cylindric-elliptic (some subglobose), amyloid, (5.3–)6–11 $\times$ 3.5–4(–4.9) μm . CHEILOCYSTIDIA clavate, 18–20(–24.5) $\times$ 8–12 μm , roughly warty. BASIDIA slightly pyriform to cylindric-clavate, (10–)12–15(–15.8) $\times$ 5–7.2(–8) μm , 2–4-spored, without basal clamp. PILEIPELLIS hyphae strongly verrucose.

SPECIMEN EXAMINED: TURKEY, TOKAT, Akbelen village, 40°27'51"N 36°39'18"E, 1034 m, on dead leaves of *Quercus* sp. (*Fagaceae*), 4 November 2017, leg. Türkekul & Işık (FGOU 5402).

COMMENTS—The features of our Turkish specimen are compatible with published descriptions of *Mycena polyadelpha* (Moser 1983, Breitenbach & Kränzlin 1991, Gerault 2005, Aronsen 2017).

Mycena polyadelpha belongs to a group of very small mycenas that grow primarily on dead *Quercus* leaves in the winter. *Mycena polyadelpha* resembles *Mycena capillaris* (Schumach.) P. Kumm. and *Mycena mucor* (Batsch) Quél., both of which also grow on fallen *Quercus* leaves. However, *M. capillaris* is distinguished by its adnexed gills while *M. mucor* is separated by its cheilocystidia with long, thin-cylindrical rarely branched excrescences at the apex and stipe with a small basal disc (Breitenbach & Kränzlin 1991, Aronsen 2017).

FIG.3. *Mycena polyadelpha* (FGOU 5402): A. Basidiomata habit; B. cheilocystidia; C. basidia; D. verrucose pileipellis elements; E. basidiospores. Scale bars: A = 3 mm; B–E = 10 μm .



Rutstroemiaceae

Rutstroemia conformata (P. Karst.) Nannf.,

Fung. Exsicc. Suec.: no. 1174 (1942)

FIGS 4, 5

APOTHECIA 0.8–1.5(–2) mm wide, deeply cup-shaped when young, later disc-shaped, yellowish brown, margin sometimes slightly transparent. STIPE 2–9(–9.5) × (0.2–)0.3–0.45 mm, deep dull brown, thinly white tomentose.

ASCOSPORES (8–)8.5–11.5(–12) × 4–5.5(–6.0) µm, ellipsoid, smooth, hyaline, irregularly uniseriate, usually with two small oil drops (some with one large central drop or several scattered drops), contents otherwise homogeneous. ASCI (73–)78.5–110.4 × 6–9.4 µm, cylindric, 8-spored, dull blue at the pore in Melzer's. PARAPHYSES filiform, septate, branched, hyaline, simple.

SPECIMEN EXAMINED: TURKEY, TOKAT, Çamaltı village, 40°16'13"N 36°26'09"E, 1132 m, on decaying leaves of *Alnus glutinosa*, 27 May 2017, leg. Türkekul & Işık (FGOU 5274).

COMMENTS—Our specimen matched previous descriptions of *Rutstroemia conformata* (Maas Geesteranus 1954, Palmer & Tortic 1994, Verkley 1993).

Rutstroemia conformata resembles *Ciboria amentacea*, which differs by its ochre to ochre-brown hymenium, its non-septate paraphyses, and its much longer stipe (5–25 mm; Breitenbach & Kränzlin 1984).



FIG. 4. *Rutstroemia conformata* (FGOU 5274): A. apothecia in situ. Scale bar = 1 mm.



FIG. 5. *Rutstroemia conformata* (FGOU 5274): B. asci with uniseriate ascospores; C. asci with ascospores and paraphyses; D. branching paraphyses. Scale bars = 10 μ m.

*Helotiaceae**Symphyosirinia galii* E.A. Ellis,

Trans. Norfolk Norwich Naturalists' Soc. 18(3): 11 (1956)

FIG. 6

APOTHECIA (0.5–)1.0–1.5 mm across, shallowly cup-shaped or flat, white or light whitish brown. HYMENIUM smooth, light cream or pale white. STIPE (3–)5–7(–8) × (0.2–)0.3–0.4(–0.6) mm, smooth, cylindric, white above and becoming brown downward.

ASCOSPORES (9.5–)10–14.6(–15.0) × (3–)3.5–4.0 µm, clavate or slightly scutuloid, hyaline, biseriate, granular, one droplet. ASCI (95–)100–127 × 7–8.6(–9) µm, cylindric, 8-spored, arising from simple septa. PARAPHYSES 90–110 × 1.5–2(–3) µm, filiform to slightly cylindrical, abundant, sometimes forked at the apex.

SPECIMEN EXAMINED: TURKEY, TOKAT, Çamaltı village, 41°27'47"N 36°38'28"E, 1191 m, on fallen mericarps of *Galium* sp. (*Rubiaceae*), 24 September 2017, leg. Türkekul & Işık (FGOU 5362).

COMMENTS—Our Turkish collection has longer stipes than cited by Ellis (1956: 3 × 0.3–0.7 mm) and some ascospores are slightly scutuloid.

Symphyosirinia heraclei E.A. Ellis is distinguished from *S. galii* by its larger apothecia (1–3(–5) mm), its larger ascospores (18–24 × 6–7 µm), and its umbelliferous hosts *Heracleum* and *Conium* (Ellis 1980, Baral 1994). *Symphyosirinia angelicae* E.A. Ellis differs from *S. galii* by its larger apothecia (1–3(–5) mm), its larger ascospores (12–20 × 3.5–5 µm), and its umbelliferous hosts *Angelica* and *Peucedanum* (Ellis 1956, 1980; Baral 1994).

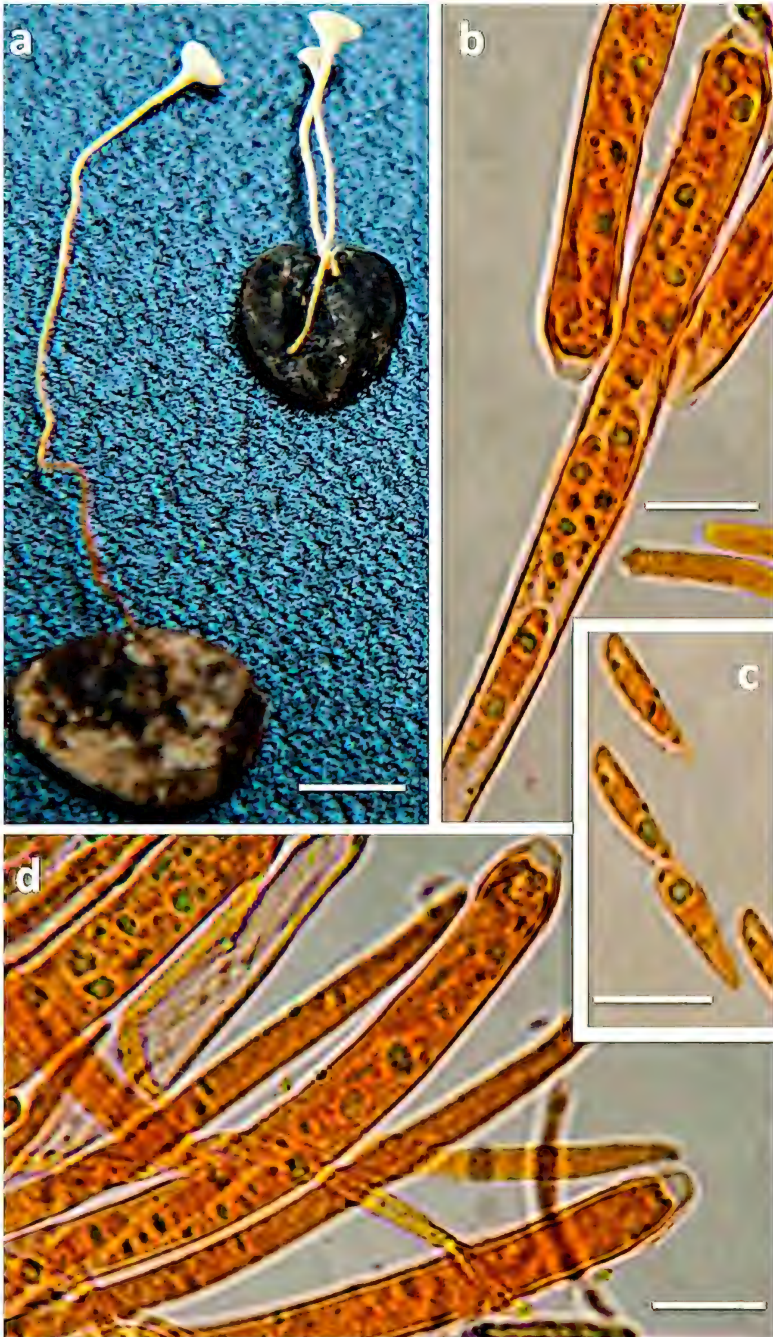
FIG. 6. *Symphyosirinia galii* (FGOU 5362): A. long-stiped apothecia; B. apex of asci with ascospores; C. ascospores; D. asci and paraphyses. Scale bars: A = 2 mm; B–D = 10 µm.

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